



Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claims 1 and 2 (canceled)

3. (currently amended) A biological photometer comprising a light source which generates light being irradiated to a subject, a photometer unit which detects light transmitted inside the subject and produces a hemoglobin signal corresponding to hemoglobin density inside the subject, and a signal processing unit which prepares hemoglobin variation information of the subject based on the hemoglobin signal and displays the same hemoglobin variation information, characterized in that the signal processing unit is provided with a memory unit which stores characteristics of hemoglobin variation patterns of respective normal health and a variety of diseases as reference templates, a characteristic extraction unit which extracts characteristics of hemoglobin variation ~~patterns~~ pattern of normal health and a variety of diseases ~~the subject~~ based on the hemoglobin signal produced by the photometer unit, and a judgment unit which judges normal health or a kind of disease of the subject through comparison between the extracted characteristic of the hemoglobin variation pattern and ~~the~~ respective reference templates of the normal health and the variety of diseases stored in the memory unit.

4. (currently amended) A biological photometer according to ~~any one of claims 1 through claim~~ 3, characterized in that the characteristic of hemoglobin variation

patterns includes at least one of a hemoglobin variation pattern curve, latent time, maximum level, time for attaining the maximum level, differential quantitative change and integral quantitative change determined from the curve.

5. (currently amended) A biological photometer comprising;

a light source unit which generates light having a predetermined wavelength in a region from visual to infrared;

an optical fiber which guides the light from the light source unit to a detection portion of a subject and irradiates the ~~same~~ guided light thereto;

a photometer unit which detects light irradiated from the optical fiber and transmitted inside the subject and produces a hemoglobin signal corresponding to hemoglobin density at the detection portion of the subject; and

a signal processing unit which prepares a hemoglobin variation at the detection portion of the subject along a time axis based on the hemoglobin signal from the photometer unit and displays the ~~same~~ hemoglobin variation, characterized in that,

the signal processing unit is provided with a characteristic extraction unit which extracts characteristics of a hemoglobin variation pattern based on the prepared hemoglobin variation at the detection portion of the subject, a memory unit which stores ~~the~~ characteristics of the hemoglobin variation ~~pattern~~ patterns at the same detection portions of respective normal health and a variety of diseases in a form of reference templates, and a judgment unit which compares ~~between~~ the characteristics of the hemoglobin variation pattern at the detection portion of the subject extracted by the characteristic extraction unit and the reference templates representing the characteristics of the hemoglobin variation patterns at the same

detection portions of the respective normal health and a variety of diseases stored in the memory unit and judges whether the subject is in normal health or in any one of the diseases.

6. (currently amended) A biological photometer ~~according to claim 5,~~ comprising:  
a light source unit which generates light having a predetermined wavelength  
in a region from visual to infrared;

an optical fiber which guides the light from the light source unit to a detection  
portion of a subject and irradiates the guided light thereto;

a photometer unit which detects light irradiated from the optical fiber and  
transmitted inside the subject and produces a hemoglobin signal corresponding to  
hemoglobin density at the detection portion of the subject; and

a signal processing unit which prepares a hemoglobin variation at the  
detection portion of the subject along a time axis based on the hemoglobin signal  
from the photometer unit and displays the hemoglobin variation, characterized in  
that,

the signal processing unit is provided with a characteristic extraction unit  
which extracts characteristics of a hemoglobin variation pattern based on the  
prepared hemoglobin variation at the detection portion of the subject, a memory unit  
which stores characteristics of the hemoglobin variation patterns at the same  
detection portions of respective normal health and a variety of diseases in a form of  
reference templates, and a judgment unit which compares the characteristics of the  
hemoglobin variation pattern at the detection portion of the subject extracted by the  
characteristic extraction unit and the reference templates representing the  
characteristics of the hemoglobin variation patterns at the same detection portions of

the respective normal health and variety of diseases stored in the memory unit and judges whether the subject is in normal health or in any one of the diseases;

characterized in that the judgment unit determines a correlation coefficient  $\rho$  between a hemoglobin variation pattern curve of the hemoglobin variation pattern at the detection portion of the subject extracted by the characteristic extraction unit and a hemoglobin variation pattern curve in the reference templates of normal health and ~~a~~the variety of diseases at the same detection portions stored in the memory unit and judges whether the subject is in normal health or in any one of the diseases based on the determined correlation coefficient.

7. (currently amended) A biological photometer according to claim 5, characterized in that the judgment unit judges whether the subject is in normal health or in any one of the diseases based on a comparison between at least one of latent time, maximum level, time for attaining the maximum, differential change value and integral change value of a hemoglobin variation pattern curve of the hemoglobin variation pattern at the detection portion of the subject extracted by the characteristic extraction unit and the characteristics corresponding to the reference templates of normal health and ~~a~~the variety of diseases at the same detection portions stored in the memory unit.

8. (currently amended) A biological photometer ~~according to claim 3 or 5,~~ comprising a light source which generates light being irradiated to a subject, a photometer unit which detects light transmitted inside the subject and produces a hemoglobin signal corresponding to hemoglobin density inside the subject and a signal processing unit which prepares hemoglobin variation information of the

subject based on the hemoglobin signal and displays the hemoglobin variation information, characterized in that the signal processing unit is provided with a memory unit which stores characteristics of hemoglobin variation patterns of respective normal health and a variety of diseases as reference templates, a characteristic extraction unit which extracts characteristics of hemoglobin variation pattern of the subject based on the hemoglobin signal produced by the photometer unit, and a judgment unit which judges normal health or a kind of disease of the subject through comparison between the extracted characteristic of the hemoglobin variation pattern and the respective reference templates of the normal health and the variety of diseases stored in the memory unit;

characterized in that the signal processing unit modifies the reference templates at the same detection portions of the normal health and ~~a~~ the variety of diseases stored in the memory unit by making use of the characteristics of the hemoglobin variation pattern at the detection portion of the subject extracted by the characteristic extraction unit and the judgment result by the judgment unit whether the subject is in normal health or any one of the diseases based on the characteristics.

9. (new) A biological photometer comprising;

a light source unit which generates light having a predetermined wavelength in a region from visual to infrared;

an optical fiber which guides the light from the light source unit to a detection portion of a subject and irradiates the guide light thereto;

a photometer unit which detects light irradiated from the optical fiber and transmitted inside the subject and produces a hemoglobin signal corresponding to hemoglobin density at the detection portion of the subject; and

a signal processing unit which prepares a hemoglobin variation at the detection portion of the subject along a time axis based on the hemoglobin signal from the photometer unit and displays the hemoglobin variation, characterized in that,

the signal processing unit is provided with a characteristic extraction unit which extracts characteristics of a hemoglobin variation pattern based on the prepared hemoglobin variation at the detection portion of the subject, a memory unit which stores characteristics of the hemoglobin variation patterns at the same detection portions of respective normal health and a variety of diseases in a form of reference templates, and a judgment unit which compares the characteristics of the hemoglobin variation pattern at the detection portion of the subject extracted by the characteristic extraction unit and the reference templates representing the characteristics of the hemoglobin variation patterns at the same detection portions of the respective normal health and a variety of diseases stored in the memory unit and judges whether the subject is in normal health or in any one of the diseases;

characterized in that the signal processing unit modifies the reference templates at the same detection portions of the normal health and the variety of diseases stored in the memory unit by making use of the characteristics of the hemoglobin variation pattern at the detection portion of the subject extracted by the characteristic extraction unit and the judgment result by the judgment unit whether the subject is in normal health or any one of the diseases based on the characteristics.

10. (new) A biological photometer according to claim 3, wherein the reference templates stored in the memory unit are prepared by statistically processing hemoglobin variation signals measured in advance of normal health persons and patients of the variety of diseases.

11. (new) A biological photometer according to claim 5, wherein the reference templates stored in the memory unit are prepared by statistically processing hemoglobin variation signals measured in advance of normal health persons and patients of the variety of diseases.

12. (new) A biological photometer according to claim 4, wherein the latent time is a period from beginning of a task to a moment when the hemoglobin signal exceeds a threshold value.

13. (new) A biological photometer according to claim 7, wherein the latent time is a period from beginning of a task to a moment when the hemoglobin signal exceeds a threshold value.

14. (new) A biological photometer according to claim 4, wherein the time for attaining the maximum level is a period from a moment when the hemoglobin signal exceeds a threshold value to a moment when the hemoglobin signal attains the maximum level.

15. (new) A biological photometer according to claim 7, wherein the time for attaining the maximum level is a period from a moment when the hemoglobin signal exceeds a threshold value to a moment when the hemoglobin signal attains the maximum level.

16. (new) A biological photometer according to claim 4, wherein the integral quantitative change is an area determined by integrating the hemoglobin signal variation curve from a moment when the hemoglobin signal exceeds a threshold value to a moment when the hemoglobin signal drops below the threshold value.

17. (new) A biological photometer according to claim 7, wherein the integral quantitative change is an area determined by integrating the hemoglobin signal variation curve from a moment when the hemoglobin signal exceeds a threshold value to a moment when the hemoglobin signal drops below the threshold value.

18. (new) A biological photometer according to claim 3, wherein the reference templates stored in the memory unit are prepared by subjecting hemoglobin signals of a plurality of normal health persons and a plurality of patients of the variety of diseases to adding and averaging processing.

19. (new) A biological photometer according to claim 5, wherein the reference templates stored in the memory unit are prepared by subjecting hemoglobin signals of a plurality of normal health persons and a plurality of patients of the variety of diseases to adding and averaging processing.



20. (new) A biological photometer according to claim 18, wherein the characteristics of hemoglobin variation of the reference templates are determined from variation patterns of the hemoglobin signals after being subjected to the adding and averaging processing.

21. (new) A biological photometer according to claim 19, wherein the characteristics of hemoglobin variation of the reference templates are determined from variation patterns of the hemoglobin signals after being subjected to the adding and averaging processing.

22. (new) A biological photometer according to claim 18, wherein in a case of a disease when the hemoglobin variation is limited at a specific region, the characteristics of hemoglobin variation of the reference templates are determined by adding and averaging hemoglobin signals only from measurement points covered by the specific region.

23. (new) A biological photometer according to claim 19, wherein in a case of a disease when the hemoglobin variation is limited at a specific region, the characteristics of hemoglobin variation of the reference templates are determined by adding and averaging hemoglobin signals only from measurement points covered by the specific region.

24. (new) A biological photometer according to claim 3, wherein, the judgment unit judges a kind of disease based on a correlation between the measured

hemoglobin signals and the average variation patterns of the reference templates stored in the memory unit.

25. (new) A biological photometer according to claim 5, wherein, the judgment unit judges a kind of disease based on a correlation between the measured hemoglobin signals and the average variation patterns of the reference templates stored in the memory unit.

26. (new) A biological photometer according to claim 3, wherein, the judgment unit determines correlations between the measured hemoglobin signals and the average variation patterns of the plurality of reference templates stored in the memory unit and judges a kind of disease based on a reference template having the highest correlation or a reference template having a predetermined value.

27. (new) A biological photometer according to claim 5, wherein, the judgment unit determines correlations between the measured hemoglobin signals and the average variation patterns of the plurality of reference templates stored in the memory unit and judges a kind of disease based on a reference template having the highest correlation or a reference template having a predetermined value.

28. (new) A biological photometer according to claim 3, wherein, the signal processing unit displays the judgment result from the judgment unit.

29. (new) A biological photometer according to claim 5, wherein, the signal processing unit displays the judgment result from the judgment unit.

30. (new) A biological photometer according to claim 6, wherein, the signal processing unit displays correlations with respective diseases.

31. (new) A biological photometer according to claim 4, wherein, the judgment unit determines whether the characteristics of the measured hemoglobin variation is within the standard deviation in the reference template of a predetermined disease and if within the standard deviation judged as the disease.

32. (new) A biological photometer according to claim 7, wherein, the judgment unit determines whether the characteristics of the measured hemoglobin variation is within the standard deviation in the reference template of a predetermined disease and if within the standard deviation judged as the disease.

33. (new) A biological photometer according to claim 4, wherein, when a predetermined number of characteristics of hemoglobin variation among a plurality of characteristics of hemoglobin variation indicates a disease, the judgment unit judges the indicated disease as the disease.

34. (new) A biological photometer according to claim 7, wherein, when a predetermined number of characteristics of hemoglobin variation among a plurality of characteristics of hemoglobin variation indicates a disease, the judgment unit judges the indicated disease as the disease.